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(54) Title: HEAT TRANSFER FLUIDS FOR APPLICATION OVER A BROAD RANGE OF TEMPERATURES

(57) Abstract: Heat transfer fluids which can be used over a broad range of temperatures such as from 175 °C to -145 °C are disclosed. The heat transfer fluids consist essentially of a mixture of at least two structurally non-identical cycloalkane-alkyl or -polyalkyl compounds, or a mixture of at least two structurally non-identical aliphatic hydrocarbons, or a mixture of a cycloalkanealkyl or -polyalkyl compound and an aliphatic hydrocarbon. The individual components are present at levels such as to confer to the fluid composition a cloud point below -100 °C, a vapor pressure at +175 °C below 1300 kPa, and a viscosity, measured at the cloud point temperature +10 °C, below 400 cP.

INTERNATIONAL SEARCH REPORT

Inter Application No PCT/EP 03/12170

A. CLASSIFICATION OF SUBJECT MATTER IPC 7 C09K5/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

 $\begin{array}{ll} \text{Minimum documentation searched (classification system followed by classification symbols)} \\ \text{IPC 7} & \text{C09K} \end{array}$

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, CHEM ABS Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT							
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.					
A	DE 28 39 513 A (RHONE POULENC IND) 22 March 1979 (1979-03-22) the whole document	1					
Α	US 6 086 782 A (WIELAND KENNETH F ET AL) 11 July 2000 (2000-07-11) cited in the application claims 1,14; table 2	1,2,6					
A	DE 100 31 020 A (LINDE GAS AG) 6 December 2001 (2001-12-06) cited in the application the whole document	1,3,7					
A	DE 42 40 306 A (BAYER AG) 9 June 1994 (1994-06-09) cited in the application the whole document	1,2,6					
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INTERNATIONAL SEARCH REPORT

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C.(Continua	C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT							
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.						
A	DE 198 53 571 A (MESSER GRIESHEIM GMBH) 25 May 2000 (2000-05-25) the whole document	1,2,6						
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INTERNATIONAL SEARCH REPORT

Information on patent family members

Inter Application No
PCT/EP 03/12170

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
DE 2839513	À	22-03-1979	FR DE ES	2402695 A1 2839513 A1 473319 A1	06-04-1979 22-03-1979 01-05-1979
US 6086782	Α	11-07-2000	NONE		
DE 10031020	A	06-12-2001	DE AU WO EP	10031020 A1 6750501 A 0192436 A1 1287089 A1	06-12-2001 11-12-2001 06-12-2001 05-03-2003
DE 4240306	Α	09-06-1994	DE	4240306 A1	09-06-1994
DE 19853571	Α	25-05-2000	DE	19853571 A1	25-05-2000